



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|-------------------------|-------------------------------|------------------------|
| 10/734,803 | 12/12/2003 | Joseph Carmine Centanni | Centanni 2-32-9-22-5-7 (L) | 3519 |
| 46363 7590 03/31/2008 PATTERSON & SHERIDAN, LLP/ LUCENT TECHNOLOGIES, INC 595 SHREWSBURY AVENUE SHREWSBURY, NJ 07702 | | | EXAMINER CURS, NATHAN M | |
| | | | ART UNIT 2613 | PAPER NUMBER |
| | | | MAIL DATE 03/31/2008 | DELIVERY MODE PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|--|--|
| Office Action Summary | Application No. 10/734,803 | Applicant(s) CENTANNI ET AL. | |
| | Examiner NATHAN M. CURS | Art Unit 2613 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 December 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 and 24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,8-10 and 14-20 is/are rejected.
- 7) ☒ Claim(s) 3,5-7,11-13 and 21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 4, 8-10, 14-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeda et al. ("Takeda") (US Patent No. 6424774) in view of Bjarklev et al. ("Bjarklev") (US Patent Application Publication No. 2004/0100681) and further in view of Cearns et al. ("Cearns") (US Patent No. 5943149).

Regarding claim 1, Takeda discloses an optical switch, comprising: a first optical combiner for combining an input data signal with two pump signals, alternatively with each pump signal, to produce a combined signal (fig. 3, elements 22, 24, 25 and 27 and col. 4, line 31 to col. 5, line 29), a non-linear optical element for imparting a non-linear effect on the combined signal to generate a number of optical bands based on simultaneous interaction of one of the pump signals and the data signal (fig. 3, elements 21 and col. 4, line 31 to col. 5, line 29); and at least one optical splitter for separating the combined signal from said non-linear optical element into optical bands (fig. 3, element 23 and col. 5, lines 6-22, where the BPF splits both λ_{c1} and λ_{c2} from the combined signal); wherein at least one of said at least two optical pump signals is controllably modulated such that a logic sequence of said input data signal is controllably switched (fig. 3, element 27 and col. 5, lines 6-22). Takeda does not disclose combining two pumps into a first combined signal and then combining the first combined signal

Art Unit: 2613

with the data signal to generate the optical bands based on a simultaneous three-signal interaction. Takeda discloses two pumps signals, but only one pump signal at a time is combined with the data signal. Bjarklev discloses using two pumps signals together in a four-wave mixer (paragraph 0002). It would have been obvious to one of ordinary skill in the art at the time of the invention to add an additional pump signal in Takeda, combining it with each alternating pump signal by coupling the additional pump signal to the output of the selector, to provide the benefit of ensuring polarization insensitive operation, as taught by Bjarklev. Takeda discloses that the BPF splits out the two converted data signals from the combined signal, but does not disclose that that splitter splits out the pump wavelength as well. Cearn's discloses an optical BPF that passes the filter wavelengths through and reflects the unfiltered wavelengths (fig. 4 and col. 5, lines 23-50). One of ordinary skill in the art at the time of the invention could have used a BPF like that of Cearn's for the BPF of the combination and the results of the substitution would have been predictable; namely, the pump signal would be reflected instead of blocked. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a BPF like that of Cearn's for the BPF of the combination for the predictable result of reflecting the pump signal instead of blocking it.

Regarding claim 2, the combination of Takeda, Bjarklev and Cearn's discloses the optical switch of claim 1, further comprising at least two optical pump sources, each of said sources providing one of said at least two optical pump signals, wherein at least one of said at least two optical pump sources is adapted to controllably modulate its respective optical signal such that a logic sequence of said input data signal is controllably switched and an output signal of said optical switch comprises a multi-band switched optical signal (Takeda: fig. 3 and col. 4, line 31 to col. 5, line 29)

Regarding claim 4, the combination of Takeda, Bjarklev and Cearn's discloses the optical switch of claim 2, further comprising a controller for controlling the modulation of the at least one modulated optical pump source (Takeda: fig. 3, where the control signal indicates a controller).

Regarding claim 8, the combination of Takeda, Bjarklev and Cearn's discloses the optical switch of claim 1, wherein said non-linear optical element comprises a highly non-linear fiber (Takeda: col. 2, lines 62-65).

Regarding claim 9, the combination of Takeda, Bjarklev and Cearn's discloses the optical switch of claim 1, wherein said non-linear optical element generates a parametric amplification of the combined signals (Takeda: col. 4, line 31 to col. 5, line 29 and Bjarklev: paragraph 0002, as applicable in the combination).

Regarding claim 10, the combination of Takeda, Bjarklev and Cearn's discloses the optical switch of claim 9, wherein said non-linear effect comprises difference frequency generation (Takeda: col. 4, line 31 to col. 5, line 29).

Regarding claim 14, the combination of Takeda, Bjarklev and Cearn's discloses the optical switch of claim 9, wherein each wavelength of said input data signal is converted into a corresponding wavelength in said respective generated optical bands (Takeda: col. 4, line 31 to col. 5, line 29).

Regarding claim 15, the combination of Takeda, Bjarklev and Cearn's discloses the optical switch of claim 2, wherein said optical pump sources comprise laser sources (Takeda: fig. 3, elements 22).

Regarding claim 16, the combination of Takeda, Bjarklev and Cearn's discloses the optical switch of claim 1, and discloses that said first optical combiner comprises a band splitter (Takeda: fig. 3, element 25 and col. 4 lines 58-61, where the wavelength multiplexer reads on a band splitter used to multiplex instead of demultiplex), but the combination as described above

Art Unit: 2613

does not disclose that the additional pump signal coupled to the output of the selector is combined using a band splitter. However, one of ordinary skill in the art at the time of the invention could have using a wavelength multiplexer like that of fig. 3 element 25 to couple the additional pump wavelength of the combination to the output of the selector as described above, and the results would have been predictable. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to couple the additional pump wavelength of the combination to the output of the selector using a wavelength multiplexer, for the predictable result of achieving a single multi-wavelength signal.

Regarding claim 17, the combination of Takeda, Bjarklev and Cearns discloses the optical switch of claim 1, wherein said at least one optical splitter comprises a band splitter (Takeda: fig. 3, element 23 and Cearns: fig. 4 and col. 5, lines 23-50, as applicable in the combination).

Regarding claim 18, Takeda discloses a method of optical switching using a fiber parametric device having at least two optical pump sources, comprising: combining an input data signal with two pump signals, alternatively with each pump signal, to produce a combined signal (fig. 3, elements 22, 24, 25 and 27 and col. 4, line 31 to col. 5, line 29), imparting a non-linear effect on the combined signal to generate a number of optical bands based on simultaneous interaction of one of the pump signals and the data signal of (fig. 3, elements 21 and col. 4, line 31 to col. 5, line 29); and controllably modulating at least one of said at least two pump sources such that a logic sequence of said input data signal is controllably switched (fig. 3, element 27 and col. 5, lines 6-22). Takeda discloses two pumps signals, but only one pump signal at a time is combined with the data signal. Takeda does not disclose combining two pumps into a first combined signal and then combining the first combined signal with the data signal to generate the optical bands based on a simultaneous three-signal interaction. And

Art Unit: 2613

Takeda discloses that the BPF splits out the two converted data signals from the combined signal, but does not disclose that that splitter splits out the pump wavelength as well. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Bjarklev and Cearn's with Takeda as described above for claim 1.

Regarding claim 19, the combination of Takeda, Bjarklev and Cearn's discloses the method of claim 18, further comprising separating said generated optical bands using one or more band splitters (Takeda: fig. 3, element 23 and col. 5, lines 6-22, where the BPF splits both λ_{c1} and λ_{c2} from the combined signal).

Regarding claim 20, the combination of Takeda, Bjarklev and Cearn's discloses the method of claim 19, wherein said non-linear effect generates a parametric amplification of said combined signal such that an output of said fiber parametric device comprises one or more switched optical signals corresponding to one or more of the generated optical signals (Takeda: col. 4, line 31 to col. 5, line 29).

Allowable Subject Matter

3. Claim 24 is allowed.
4. Claims 3, 5-7, 11-13 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

5. Applicant's arguments filed 17 December 2007 have been fully considered but they are not persuasive.

In the Remarks page 10 lines 12-21, the Applicant argues that if Takeda and Bjarklev were combined, the non-linear effect in each non-linear fiber of Takeda would still involve only one requisite pump signal and the data signal. It appears from this argument that the Applicant believes the combination is based on providing both existing "selector" pump signals of Takeda fig. 3 to the non-linear fibers at the same time. However, such an interpretation does not reflect the combination. The combination is based on *adding another* pump signal to Takeda, in addition to the two existing "selector" pump signals, based on Bjarklev's teaching with respect to using two pump signals for polarization insensitive operation. In the combination, each non-linear fiber receives two pump signals (the respective Takeda-original pump plus the additional pump) plus the data signal.

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Conclusion

7. Any inquiry concerning this communication from the examiner should be directed to N. Curs whose telephone number is (571) 272-3028. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached at (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pairedirect.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Jason Chan/

Supervisory Patent Examiner, Art Unit 2613